



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 940 724 A3**

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
07.06.2000 Bulletin 2000/23

(51) Int. Cl.⁷: **G03F 7/32**

(43) Date of publication A2:
08.09.1999 Bulletin 1999/36

(21) Application number: 99102864.8

(22) Date of filing: 03.03.1999

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **05.03.1998 JP 5301398**
29.05.1998 JP 14994698

(71) Applicant:
Hitachi Chemical DuPont MicroSystems Ltd.
Shibuya-ku, Tokyo (JP)

(72) Inventors:
• **Komatsu, Hiroshi**
Hitachi-shi, Ibaraki-ken (JP)
• **Motobe, Takeharu**
Hitachi-shi, Ibaraki-ken (JP)

(74) Representative: **HOFFMANN - EITLE**
Patent- und Rechtsanwälte
Arabellastrasse 4
81925 München (DE)

(54) **Developer for photosensitive polyimide precursor, and method of using it for patterning**

(57) The invention provides a developer for photo-sensitive polyimides, with which polyimide patterning for interlayer insulating films for multi-layered circuit boards and for α -ray shield layers, buffer coat layers and others for semiconductor memory devices is attained within a shorter period of time than with conventional developers. It provides a developer for photosensitive polyimide precursors, which comprises two or more solvents including at least an aprotic polar solvent, and in which the mixed solution of the solvents has a polar component solubility parameter, δ_P , of not smaller than 7, and provides a patterning method of using the developer.

EP 0 940 724 A3

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 99 10 2864

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-04-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 03188449 A	16-08-1991	JP 2936607 B	23-08-1999
GB 2107889 A	05-05-1983	NONE	
US 3993489 A	23-11-1976	US 3925076 A	09-12-1975
		US 8415845 I	28-01-1975
EP 475086 A	18-03-1992	JP 4120542 A	21-04-1992
		KR 9407796 B	25-08-1994
US 4547455 A	15-10-1985	JP 1690745 C	27-08-1992
		JP 3056468 B	28-08-1991
		JP 58223149 A	24-12-1983
		EP 0101165 A	22-02-1984
EP 505161 A	23-09-1992	JP 2687751 B	08-12-1997
		JP 4288365 A	13-10-1992
		DE 69229419 D	22-07-1999
		DE 69229419 T	04-11-1999
		KR 174560 B	20-03-1999
		US 5292619 A	08-03-1994
EP 704743 A	03-04-1996	JP 8101393 A	16-04-1996
		US 5607732 A	04-03-1997
US 5317082 A	31-05-1994	AU 5747394 A	19-07-1994
		CA 2151615 A	07-07-1994
		DE 69317127 D	02-04-1998
		DE 69317127 T	08-10-1998
		EP 0675915 A	11-10-1995
		JP 8504967 T	28-05-1996
		WO 9414874 A	07-07-1994
		US 5449742 A	12-09-1995

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 10 2864

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 547 455 A (HIRAMOTO ET AL.) 15 October 1985 (1985-10-15) * claim 1 *	1-8	
X	EP 0 505 161 A (SHIN-ETSU CHEMICAL CO., LTD.) 23 September 1992 (1992-09-23) * page 14, line 25-32; claims 1,7 *	1-8	
X	EP 0 704 743 A (NISSAN CHEMICAL INDUSTRIES LTD.) 3 April 1996 (1996-04-03) * page 4, line 53-59; claim 5 *	1	
X	US 5 317 082 A (BUEHLER ET AL.) 31 May 1994 (1994-05-31) * column 9, line 28-43 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 5 April 2000	Examiner Thiele, N
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (PdA01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 10 2864

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-04-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 03188449 A	16-08-1991	JP 2936607 B	23-08-1999
GB 2107889 A	05-05-1983	NONE	
US 3993489 A	23-11-1976	US 3925076 A	09-12-1975
		US 8415845 I	28-01-1975
EP 475086 A	18-03-1992	JP 4120542 A	21-04-1992
		KR 9407796 B	25-08-1994
US 4547455 A	15-10-1985	JP 1690745 C	27-08-1992
		JP 3056468 B	28-08-1991
		JP 58223149 A	24-12-1983
		EP 0101165 A	22-02-1984
EP 505161 A	23-09-1992	JP 2687751 B	08-12-1997
		JP 4288365 A	13-10-1992
		DE 69229419 D	22-07-1999
		DE 69229419 T	04-11-1999
		KR 174560 B	20-03-1999
		US 5292619 A	08-03-1994
EP 704743 A	03-04-1996	JP 8101393 A	16-04-1996
		US 5607732 A	04-03-1997
US 5317082 A	31-05-1994	AU 5747394 A	19-07-1994
		CA 2151615 A	07-07-1994
		DE 69317127 D	02-04-1998
		DE 69317127 T	08-10-1998
		EP 0675915 A	11-10-1995
		JP 8504967 T	28-05-1996
		WO 9414874 A	07-07-1994
		US 5449742 A	12-09-1995

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82